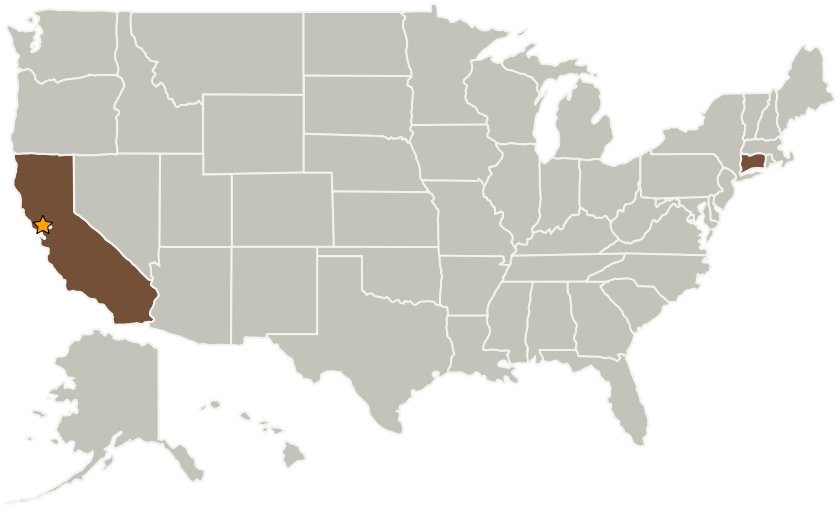
Lab-on-a-chip Astrobiology Analyzer, Phase II

Completed Technology Project (2004 - 2006)

Project Introduction

The overall goal of this program (through Phase III) is to develop an analyzer to measure chemical signatures of life in extraterrestrial settings. The analyzer will employ a lab-on-a-chip to extract biochemical signatures from soil or water samples and surface-enhanced Raman spectroscopy (SERS) to detect and identify the signatures. The Phase I program successfully employed a metal-doped sol-gel to both chemically separate and generate SERS of amino acids in flowing water. This novel approach measured 19 of the 20 protein amino acids typically at 1 microg/mL (1 part-per-million) in 1 minute with estimated limits of detection of 10-100 nanog/mL (10-100 part-per-billion). The Phase II program will design, build and test a prototype lab-on-a-chip using 96 chemicals. The program includes a clear path to improving sensitivity by 4-orders of magnitude to part-per-trillion sensitivity. The prototype will be demonstrated at Hamilton Sundstrand's Pomona facilities to initiate a Phase III collaboration.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Real-Time Analyzers, Inc.	Supporting Organization	Industry	Middletown, Connecticut

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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California	Connecticut

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.1 Power Generation and Energy Conversion
    - TX03.1.2 Heat Sources